ambition of modern laboratories, and one which cannot be too strongly impressed on young workers.

The author's treatment of that most important subject of protoplasmic fusion is not entirely satisfactory. He distinguishes two kinds: (1) fusion in which several cells unite to form a multinucleated mass, as in the *Mycetozoa* and some *Rhizopoda*; (2) conjugation, in which two or more cells fuse to form one cell; the distinction being that while in the latter case the process is accompanied by nuclear fusion, in the former it is not. In the first place it must be noted that conjugation does not always result in the formation of one cell from two, *e.g.* many ciliate infusoria; and in the second, that it is by no means certain that nuclear fusion does not occur between the nuclei of the multinucleated masses resulting from fusion. Moreover the author falls into the common error, found even in some of the best text-books, of calling conjugation a mode of reproduction. On p. 416 he says, "J'arrive maintenant à une mode spécial de reproduction, cellulaire que nous connaissons déjà, à celui que nous avons désigné sous le nom de *conjugaison* et que nous avons distingué de la *fusion*." It is perhaps hardly necessary to point out that by reproduction the number of individuals of a species is increased, while by conjugation it is generally diminished. It is true that conjugation results in the formation of a new individuality, but not in the increase in the number of individuals.

It is hardly going too far to say that conjugation is the opposite of reproduction. It is curious that this mistake should so often be made, and it is most important to call attention to it; for the confusion between the two processes, which has no doubt resulted from their accidental association in sexual reproduction, has considerably interfered with the proper appreciation of that most mysterious and important of vital processes—fusion of nuclei and protoplasm.

With regard to technical terms, we may be allowed to call attention to our author's use of the word *Cytodieresis.* He proposes this word for the process of cellular division, which is accompanied by those characteristic transformations of the nucleus which are ordinarily termed karyokinetic, reserving the word *division* for those cases in which the nucleus divides directly. We do not inquire whether such a word is required, but we desire to point out that on the very next page (296), our author uses the word Cytodieresis as the equivalent of *Caryodieresis* (indirect nuclear division). He says: "*Division indirecte* (of the nucleus) = *karyokinesis* (Schleicher) = *cytodieresis* (Henneguy) = *mitosis* (Flemming)." The looseness of thought implied by this confusion in the use of his own word is unsatisfactory, and would by some biologists be pointed to as an example of the result of too strongly holding to a theory which does not conform with all the facts.

In criticising Weismann's suggestion that the Protozoa are immortal, he says that "a Protozoon which divides dies in the sense which we attach to the death of the higher animals, *i.e.* that its individuality disappears." Though we are quite willing to admit that Weismann's statement was more of the nature of a gallery phrase designed to catch the ear of the readers of the modern magazine article, than a serious contribution to science, and that it conveyed no new idea or suggestion, we cannot follow M. Henneguy in his criticism quoted above. For do not the higher animals also undergo numerous successive divisions in the production of their reproductive cells, which differ in no essential particular from the successive binary fissions which a Paramœcium passes through in its life-history. The only difference which can be pointed to is one merely of degree; for there is no more an absolute similarity between the two products of fission in an infusorian than there is between the products of the fission (ovum or spermatozoon and parent) which is continually taking place in the higher animals. You might just as reasonably assert that a hen dies whenever it lays an egg, as make the statement that a Paramœcium dies at each process of fission. With the words death and individual a philosopher can do much; but it behoves practical men to keep a sharp look-out on the use made of those convenient terms.

The book is well printed and illustrated; and though it is not a complete and carefully elaborated treatise on protoplasm, as the author himself is the first to admit, yet it constitutes a valuable addition to the biologist's library, and cannot fail to be of great use to the teacher as well as to the student.

A ROMANTIC NATURALIST.

From North Pole to Equator, Studies of Wild Life and Scenes in many Lands. By the Naturalist-Traveller, Alfred Edmund Brehm. Translated from the German by Margaret R. Thomson. Edited by J. Arthur Thomson, M.A., F.R.S.E. (London: Blackie and Son, Ltd., 1896.)

"BETWEEN North Pole and Equator" might have been a less attractive, but would have been a more accurate title for this book, for Siberia and northern Norway are not as far north as the Pole, nor are Nubia and the Blue Nile as far south as the Equator. Between these limits, however, the late Dr. A. E. Brehm made extensive journeys, visiting most of the principal types of country that may be found therein, and studying the characteristic faunas with the enthusiasm of a born naturalist. His great "Thierleben" is a rich repository of information on the habits of animals, the various groups of which are taken in zoological order. The present book appears to be intended as a supplement to this; for it is geographical in arrangement, and consists of a series of graphic sketches of wild life in many lands.

The work opens with a brief homage to the author by his son, and then an admirable introductory essay by the editor upon the work of naturalist-travellers in general, and of A. E. Brehm in particular. Mr. Thomson gives a list of works by English naturalist-travellers, in which we notice Fred Burnaby's "Ride to Khiva," although such books as Lamont's "With the Sea Horses," Butler's "Great Lone Land," and Whymper's "Travels among the Andes of the Equator," are not mentioned.

Mr. Thomson classifies naturalist-travellers into five groups—the Romantic (including Sir John de Maundeville and other mediæval story-tellers); the Encyclopædists of the sixteenth and seventeenth centuries; the General Naturalists, ranging from Ray to Humboldt; the Specialist Type—the naturalists of the naval expeditions

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of the present century; and the Biological Type, such as Darwin, Wallace, and Bates. Mr. Thomson includes Brehm in the last group; but if we accept his definition of the Romantic Type (p. xvi.), Brehm has certain claims to be placed among these. "In days when the critical spirit was young," Mr. Thomson tells us, and "verification hardly possible; there could not but be a strong temptation to tell extraordinary 'traveller's tales.' And they did. Nor need we scoff at them loudly, for the type dies hard; every year such tales are told." We have only to turn to p. 38 to see a proof of this. There we learn that in the fiords of northern Norway "the fish swim so thickly that the boat has literally to force a way among them, . . . that an oar placed upright among the densely-packed crowd of swimmers remains for a few moments in its position before falling to one side." Or on p. 83, where we are told that in the tundra "every grass-stalk, every moss-blade, every twig, every branch, every little leaf sends forth hundreds and thousands of them [mosquitoes] all day long." After this we are prepared to learn that the mosquitoes "form swarms which look like thick black smoke; they surround, as with a fog, every creature which ventures into their domains; they fill the air in such numbers that one hardly dares to breathe; they baffle every attempt to drive them off; they transform the strongest man into an irresolute weakling, his anger into fear, his curses into groans." These are samples of the author's style, and of the precision of his descriptions. His book is written in superlatives, which appear to be laboured, and is full of humour, which is generally unintentional. But in spite of the author's command of impressive language, he is very modest; the heat of Africa, he tells us, is "indescribable," and then does his best in a page full of sentences, such as the following. "The torments are inconceivable." "Nor can any one who has not groaned through these nights, when one tosses on the couch, prevented by the sultriness from resting or sleeping, adequately sympathise with the torments to which men and animals are subjected at this season." "Men and beasts seem to wither as the grass and leaves withered." "In vain does manly courage endeavour to bear up under the burden of these days; the most resolute will give way to sighs and moans. Every piece of work fatigues, even the lightest covering is too heavy, every movement is an effort, every wound becomes a virulent sore." After this we are not surprised to find an account of a tropical thunderstorm and its effects, written in language that reads like an American journalist's report of the Johannesburg dynamite explosion; and that, in escaping the steppe fires, "antelopes, zebras and ostriches speed across the plain more quickly than the wind"; or that a view of the baobab is described as "a sight which stamps itself ineffaceably on the memory," and that nothing in the African forest can compare with it "in charm and impressiveness," as when it flowers "this incomparable giant is transformed, as if by magic, into an enormous rose-bush of indescribable beauty, the sight of which stirs the heart of even the most matter of fact of men with admiration." This appears in a chapter on the "Primæval Forests of Central Africa," though as a matter of fact the author never seems to have entered any of the real African forests; in these, indeed, the baobab is not found, it being characteristic of the steppes and scrub-covered plains. In respect to the doleb palm, we are told on the same page that "its trunk is a pillar which no artist could have surpassed; its crown a capital worthy of such a pillar." After such a compliment, this palm cannot complain at the description of the shape of its stem being exactly contrary to the facts, it thickening at half its height from the ground instead of thinning. According to the author's account, although he tells us that Northern Africa "is desert, must be desert, and will be desert for ever," it appears to be a remarkably well-peopled desert. He says that one of the most indispensable articles in an African traveller's outfit is a pair of long-legged tongs, with which to seize the vermin that swarm into camp at night, drawn by the fire. "Attracted by the light, noxious creatures come running and creeping, first one and then another, but soon in tens and in hundreds. First appear gigantic spiders, which, with their eight legs spread out, cover a surface as large as an outstretched hand. After the spiders, or sometimes along with them, the scorpions come hurrying. Both spiders and scorpions rush with sinister rapidity to the fire, clambering over carpet and coverlet, among the dishes of our simple supper, retreating when the radiating heat becomes too strong for them, turning back again under its mesmeric influence—in truth a fearsome invasion.' After these "hellish brood" come the vipers, "unmistakably on the spot," in "terrifying numbers," which "drive one almost to despair." We fear that any one who imagines that he has only to light a fire on an African steppe to be able to fill his cases with all sorts of interesting animals, which rush to him, like rats to Bishop Hatto, would find zoological collecting less exciting and profitable than he would have expected from Brehm's description.

We have given many extracts from this work, as the best method of illustrating its nature. The book is well printed and illustrated, and the translation is very readable. Only we do not see that there is very much in it worth reading. Every page is distorted by such ludicrous exaggeration, that the descriptions run dangerously near to bathos and caricature.

OUR BOOK SHELF.

The Spas and Mineral Waters of Europe, with Notes on Balneo-Therapeutic Management in Various Diseases and Morbid Conditions. By Hermann Weber, M.D., F.R.C.P., and F. Parkes Weber, M.D., M.R.C.P. 8vo, pp. 380. (London: Smith, Elder, and Co., 1896.)

THIS book contains in a brief space a large amount of most useful information in regard to the spas and mineral waters of Europe. It gives the position of the various spas, their climate, baths, and mode of access, with a list of doctors and general indications of the class of cases which are benefited by the waters. Besides an enumeration of the various spas, there is a second section dealing with diseases, and mentioning the spas most likely to be useful in each. In addition to this, a full bibliography is given.

The value of the book consists, not merely in its convenient arrangement, and in the information it gives, but in the fact that most of this information is the outcome of personal knowledge on the part of the authors This gives it a precision and value which is not always

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